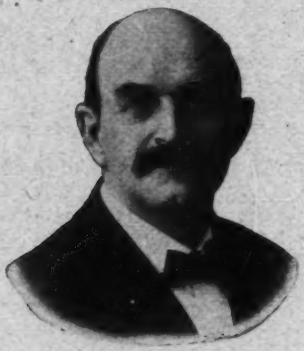
ENTOMOLOGICAL NEWS

MAY, 1933

Vol. XLIV No. 5



CHARLES WILLISON JOHNSON
1863-1932.

CONTENTS

Brues—Charles Willison Johnson, 1863–1932 113
Calkins—Observations concerning Hyloicus eremitodes Stkr. in the Vicinity of Scott City, Kansas (Lepid.: Sphingidae) 116
Haskin—Notes on Two So-called Species of Eurema (Lepid.: Asciidae) 120
Rowe—Records of Tachinidae from Illinois with Description of One New Species (Diptera) 122
Geiser—G. W. Belfrage's Texas Localities 127
Knight—Bothynotus Fieber: Descriptions of Two New Species from North America (Hemip.: Miridae) 132
Foster—Swarming of Scatopse atrata Say (Diptera: Scatopsidae) . . 136
Entomological Literature 137

PHILADELPHIA, PA.
THE ACADEMY OF NATURAL SCIENCES,
Logan Square

Entered at the Philadelphia, Pa., Post Office as Second Class Matter.
Acceptance for mailing at the special rate of postage prescribed for in Section 1.
Act of October 3, 1917, authorized January 15, 1921.

ENTOMOLOGICAL NEWS

published monthly, excepting August and September, by The American Entomological Society.

Philip P. Calvert, Ph.D., Editor; E. T. Cresson, Jr., R. G. Schmieder, Ph.D., Associate Editors.

Advisory Committee: Philip Laurent, J. A. G. Rehn, Chas. Liebeck, J. Chester Bradley, Ph.D., Frank Morton Jones, John C. Lutz, Max Kisliuk, Jr., Wm. W. Chapman.

The subscription price per year of ten (10) numbers is as follows:

United States and possessions, Central and South America	$3.00
Canada	3.15
Foreign	3.25

Single copies 35 cents.

ADVERTISING RATES: Full width of page. Payments in advance.
One issue, 1 in., $ 1.20, 2 in., $ 2.40, half page, $ 4.00, full page, $ 7.00
Ten issues " 11.00, " 20.00, " 35.00, " 60.00

SUBSCRIPTIONS. All remittances and communications regarding subscriptions, non-receipt of the NEWS or of reprints, and requests for sample copies, should be addressed to

ENTOMOLOGICAL NEWS, 1900 Race Street, PHILADELPHIA, PA.

All complaints regarding non-receipt of issues of the NEWS should be presented within three months from date of mailing of the issue. After that time such numbers, if available, will be supplied only by purchase. Not more than two issues will be replaced gratis, through loss in transit or in change of address, unless such have been registered, at the subscriber's expense. No subscriptions accepted which involve giving a receipt acknowledged before a notary, except at the subscriber's expense.

MANUSCRIPTS AND ADVERTISEMENTS. Address all other communications to the editor, Dr. P. P. Calvert, Zoological Laboratory, University of Pennsylvania, Philadelphia, Pa.

TO CONTRIBUTORS. All contributions will be considered and passed upon at our earliest convenience and, as far as may be, will be published according to date of reception. The receipt of all papers will be acknowledged. Owing to the limited size of each number of the NEWS, articles longer than six printed pages will be published in two or more installments, unless the author be willing to pay for the cost of a sufficient number of additional pages in any one issue to enable such an article to appear without division.

Proof will be sent to authors. Twenty-five "extras" of an author's contribution, without change in form and without covers, will be given free when they are wanted; if more than twenty-five copies are desired *this should be stated on the MS.*

Owing to increased cost of labor and materials, no illustrations will be published in the NEWS for the present, except where authors furnish the necessary blocks (or pay in advance the cost of making blocks) and also pay for the cost of printing plates. Information as to the cost will be furnished in each case on application to the Editor. Blocks furnished or paid for by authors will, of course, be returned to authors, after publication, if desired.

Stated Meetings of The American Entomological Society will be held at 7.30 o'clock P. M., on the fourth Thursday of each month, excepting June, July, August, November and December, and on the third Thursday of November and December.

Communications on observations made in the course of your studies are solicited; also exhibits of any specimens you consider of interest.

The printer of the "News" will furnish reprints of articles without covers over and above the twenty-five given free at the following rates: One or two pages, twenty-five copies, 35 cents; three or four pages, twenty-five copies, 70 cents; five to eight pages, twenty-five copies, $1.40; nine to twelve pages, twenty-five copies, $2.00; each half-tone plate, twenty-five copies, 30 cents; each plate of line cuts, twenty-five copies, 25 cents; greater numbers of copies will be at the corresponding multiples of these rates. Printed covers for 50 copies, $4.00 or more, according to number of pages bound.

CHARLES W. JOHNSON

ENT. NEWS, VOL. XLIV, PL. IV.

Courtesy of the Boston Society of Natural History.

ENTOMOLOGICAL NEWS

VOL. XLIV. MAY, 1933 No. 5

Charles Willison Johnson, 1863–1932.

By CHARLES T. BRUES.

(Portrait, Plate IV.)

By the death of Charles Willison Johnson on July 19, 1932, entomology suffered the loss of one of its most accomplished devotees. His death, after a brief illness, at the age of not quite seventy years, came as a wholly unexpected blow to his many friends and associates. Many students who know him through correspondence and the whole entomological world familiar with his extensive writings will mourn his loss for many years to come. Native to and reared as a boy in New Jersey, he moved to St. Augustine, Florida, at the age of eighteen. Here he spent eight years of his early life and first became seriously interested in insects and molluscs. He then removed to Philadelphia where he served as curator of the Wagner Free Institute of Science for fifteen years (1888-1903) and later to the Boston Society of Natural History where he also filled the post of curator. At the time of his death he had completed thirty years (1903-1932) of active and highly productive work at that institution.

He was an active member of several entomological and conchological societies and has served as president of the Entomological Society of America and the Cambridge Entomological Club. Since 1917 he was a fellow of the American Academy of Arts and Sciences.

Practically all of Johnson's entomological publications are primarily taxonomic, and deal with Diptera. He possessed a wonderfully wide acquaintance with the North American members of this order, involving a critical knowledge of the majority of the numerous families. Combined with his indefatigable energy and great perseverance as a collector, this led him to prepare several faunal lists as "The Diptera of Jamaica" (1894 and 1919), "Diptera of Florida" (1895 and 1913), "Diptera of New Jersey" (1900 and 1910) and finally a marvelously complete book of 326 pages on the Diptera of New England

(1925). An elaborate account of the Insect Fauna of the Mount Desert Region appeared just two years later. All of these are based in great part on material originally obtained by himself. A complete list of Johnson's entomological publications, recently published in *Psyche* (December, 1932) by Dr. A. L. Melander, includes about 180 titles. This does not include a considerable number of papers on Mollusca published over the course of many years, culminating in a large manuscript on New England, practically completed at the time of his death and now being prepared for early publication by W. J. Clench. He also served as associate editor and manager of the *Nautilus*, a malacological magazine, from 1890 till his death, a period of forty-two years.

During the full three decades spent at the Boston Society of Natural History, Johnson devoted an immense amount of time to building up the New England Collection of insects now preserved in that institution. During each summer season he made frequent short collecting trips to particularly favorable points or to localities not previously visited throughout this area. The material obtained on these excursions was gradually identified and incorporated into the collection which thus grew to be very complete and highly comprehensive from the standpoint of geographic distribution. Other collectors, fired by his enthusiasm, contributed much additional material, so that the collection enjoyed a rapid increase in size and value. A census made in 1930 showed more than 10,000 species and over 60,000 specimens from New England, the collection having grown from about 3,000 species and 8,000 specimens as a result of Johnson's unremitting efforts. Naturally the Diptera received a full share of attention, but no group was neglected as the aid of many specialists in other groups was eagerly sought, and usually secured, for his interest and pride in the collection were highly contagious. He enjoyed a wide familiarity with the entire insect fauna of New England and in conversation was able to pour out, without the slightest hesitation, information of the most surprisingly detailed nature relating to the most diverse groups.

As the result of his life-long special interest in North American Diptera, Johnson amassed a very large and complete col-

lection of specimens in this order. This received continuous and painstaking attention, almost entirely during the evening hours, as he kept it at his home until recently, when it was transferred to the Museum of Comparative Zoology at Harvard, where it now remains. Anyone who consults this collection cannot fail to sense the meticulous, almost loving care which was bestowed upon it during the course of many years.

Johnson was a very regular attendant at the monthly meetings of the Cambridge Entomological Club and furthered its interests in many ways. He served as its president during 1908 and 1915, for many years as a member of the editorial board of *Psyche* and was always ready to serve on committees. His willingness in the latter respect led the Club to avail themselves of his advice and counsel at very frequent intervals. When he was present, interest in the Club meetings never lagged, as he was always ready with a small box of flies about which an interesting discourse could be woven. On such occasions his marvelous memory and ever vigorous youthful enthusiasm were displayed to best advantage. He very rarely presented prepared papers at such meetings and relied but little on notes to guide his remarks. He nearly always joined in the discussion of subjects presented by other members or would ask questions that showed his deep interest in all aspects of entomology however foreign to his own special field.

As a fellow of the American Academy of Arts and Sciences he was also nearly always to be seen at the meetings. Some of my most vivid and pleasant impressions of him as a fellow-entomologist and personal friend were acquired at one of the little refreshment tables in the library of the Academy. Here he often joined a group of biologists after the formal session to discuss various topics. He could not forget entomology for long, however, and it was a rare occasion indeed that failed to include some reference to flies or other insects. Had it not been for such opportunities to meet with him, one might have regarded him as of rather unsociable temperament. This was by no means true, however, and was due in great measure to his desire to devote all his spare time to entomological study. Johnson was an ardent prohibitionist and the only occasion in which I have known his ever-present good humor to fail him resulted from a mention of opposing views on this question.

Ordinarily he was so engrossed in his own work that he was bothered little by the troubles of the world in general and disregarded them whenever possible.

One of Johnson's greatest contributions to entomology is not very widely known. In his position as curator, first at the Wagner Institute and later at the Museum of the Boston Society of Natural History, he came into contact with many amateurs and young people interested in entomology. The keen interest which he displayed in budding naturalists, encouraged many young men to enter this field with serious interests.*

Johnson was married at the age of thirty-four, while living in Philadelphia, to Miss Carrie W. Ford, daughter of the conchologist, John Ford. They had no children. The death of his wife in 1931 was a severe blow, from which he never recovered and was coincident with the first striking change in his demeanor which I had noticed during over twenty years' association with him.

The passing of Johnson leaves a gap in the already greatly depleted ranks of naturalists in America and one which may not be filled for many years to come.

Observations concerning Hyloicus eremitodes Stkr. in the Vicinity of Scott City, Kansas (Lepid.: Sphingidae).

By VIRGIL F. CALKINS, Scott City, Kansas.

For the past three or four years, occasional specimens of this rare Sphingid species have been taken by me in more or less faded and worn condition. Having had numerous requests for this moth from this locality which may be regarded as in the heart of its classic range, I tried each year without success to locate the food-plant of the species and to learn something of its early stages.

During the spring of 1932 Mr. John M. Geddes, of Williamsport, Penna., with whom I was in correspondence, informed me that Prof. Snow had stated in some of his writings that the larvae of *H. eremitoides* fed on wild sage (*Salvia*). This plant occurs quite abundantly in many parts of the state of Kansas and is regarded as a weed. A search of my immediate neigh-

[* In Philadelphia, H. L. Viereck, C. T. Greene and J. A. G. Rehn, as the last has told in the NEWS for June, 1932, page 141.—EDITOR.]

borhood failed to locate any plant belonging to the genus *Salvia;* however, inasmuch as I usually took a few *H. eremitoides* specimens each year, I knew their food-plant must be somewhere near at hand.

Some days after when on an excursion into the countryside, I found a large patch of *Salvia,* presumably the species *S. lanceolata.* An examination of the plants failed to reveal any Sphingid larvae, however. Wishing to have some of the plants growing near at hand for observation, I dug up several of them and transplanted them into my garden. I felt sure the plants on my premises would be singled out by any moths occurring in the vicinity and I would eventually obtain a few eggs. Daily inspection of them failed to reveal anything and I gave the idea up as hopeless.

About a month afterward, arising very early one morning, I went into the garden and glancing at the sage plants, I was rewarded by noticing a few small greenish-purple caterpillars which undoubtedly were Sphinx-moth larvae. I immediately dug up one of the plants, put the caterpillars with it and removed it to my study where I was sure they could not get away and I could observe them at my leisure.

Business took me away from home that evening, and the next morning when I thought about looking at the caterpillars, they were gone to my surprise. After searching for them, I finally found them in the corners on the floor they having apparently become dissatisfied with their changed quarters and crawled away. From then on, they refused to remain on the bucketed plant and as I wished to observe them to the final stages, I removed them to their accustomed place in the open, putting a fine screen wire cage over them and the plants. Here they were reasonably satisfied and took to eating.

The next morning when I went to look at them they had completely vanished and I was very disappointed in having to face the possibility of losing my prizes without an opportunity to observe their habits. I surmised that the things had become dissatisfied again with their surroundings and had fled. The wire cage was only placed loosely over the plants and they could have crawled under the edge with very little effort.

An evening or two later when out collecting moths, I was dumfounded to find my caterpillars in the top of the sage

plants eating away, but by this time, grown much larger in size. I knew positively that they had not been on the plants that day; I was beginning to suspect something—that these peculiar caterpillars had a hide-away some place during the day, coming out at night to do their feeding. Subsequent observations revealed that the large caterpillars burrowed down into the ground, coming out at dusk and climbing the food-plant for a night of eating. At the approach of day-light they again resorted to their underground abode. Later on, I found that only caterpillars half-grown, or larger, had this very unusual characteristic of going underground, the smaller ones remaining on the under side of the leaf of the food-plant where they were almost entirely inconspicuous. My caterpillars at this time were attaining full growth, for they were three or more inches long. Two days after, they failed to appear above the surface of the ground and I knew they were undergoing a change preparatory to the pupal state. Eighteen days later, I was rewarded with two fine *Hyloicus eremitoides* moths which I found resting on the top of the screened-in wire cage. The few remaining moths came forth within two or three days following. I had reared the larvae to maturity and found the species to be *eremitoides*.

Meanwhile, I had been searching my plants daily for eggs and I had also located a fine patch of the sage plants growing close to home. I was successful in finding a number of the eggs which I reared to maturity thus observing the complete life-history of the moth.

An interesting thing concerning the caterpillar of *Hyloicus eremitoides* is that it may be either pale green, green flecked with purple, or almost entirely a dark purplish-green, caterpillars of this color being very beautiful and the most common. In this respect, the larvae apparently exist in different colors and maculations the same as *Pholus satellitia* and *Celerio lineata*, the color having nothing to do with the adult moth. Prof. Snow was said to have described the caterpillar as being pale green with seven white stripes. It may be the larvae that he had under observance were all green, the color being dependent somewhat on different localities, or environment.

The following data may be of interest to the entomologist wishing to know more about *Hyloicus eremitoides* Stkr.

Egg: Pale green, semi-globular, smooth, slightly depressed on top. Laid preferably on the underside of the leaf of a species of *Salvia,* presumably *lanceolata.* Incubation, about 10 days.

Larvae: When first hatched, the caterpillar measures 4 mm. in length, the color being pale yellowish-green with a very prominent black caudal horn half as long as the newly hatched caterpillar itself. It moults at the end of 3, 5, 7 days and goes into the ground 10 days later. Full grown larvae measure 3 or 3½ inches being some shade of green variously flecked with minute purple specks of varying intensity, some being entirely pale green; crossed diagonally by seven white stripes which are flanked by purple, some having a distinctly purple patch around the head; 8 purple dots along the side at the base of each white stripe. Legs, pro-legs and anal prolegs, or claspers, deep purple. Horn, purple, or purplish-black. The head is very peculiar, having a pronounced protuberance almost suggestive of another horn in front, but rather blunt. Immediately in front, and behind, this pointed protuberance is a concentrated splotch of purple margined on each side by a white longitudinal stripe coming together at the top of the protuberance, or top-knot.

The larvae when half grown have the peculiar habit of burrowing into the ground during the day, coming out at night to feed. Young larvae remain on the plant, concealed lengthwise on the under surface of a leaf. Period of inactivity is about 18 days, or less, or in the case of the second brood, over winter.

Pupa: Brown, 1¾ inches in length, with a free tongue case about ⅜ of an inch long. Very similar to the pupa of *Hyloicus eremitus* Hbn.

The moth is aptly named the Hermit-like Sphinx being very hermit-like in its existence. When found in the open, it is usually resting on the sides of buildings about a foot from the ground, or on fence posts close to the ground surface. It is seldom met with on flowers. The insect may be classed as double brooded, although the broods overlap. The first appears in May and June, the second in August, continuing into the month of September. I have also taken specimens in July.

My observations of the larval stages of *H. eremitoides* were not as extensive, or complete, as I had wished for; hence, my description is only general in character. I hope to write a more detailed description of the larval stages of *eremitoides* next year, when I have had an opportunity to observe them more closely.

Notes on Two So-called Species of Eurema (Lepid. Asciidae).

By J. R. Haskin, Auburndale, Florida.

These notes are offered as evidence that *Eurema demoditas* Hubner, (commonly known as *E. delia,* Cramer), and *E. jucunda* B. & LeC. are conspecific, representing seasonal but over-lapping forms. One color variety is described as a new spring form. Another inter-connecting fall form corresponds to the description of form *cepio,* G. & S.

Eurema demoditas Hübner, 1818.

delia, Cramer, 1780 (nec D. & S. 1776).
daria Godart, 1819.
form jucunda B. & LeC., 1830.
form cepio G. & S., 1889.
form delioides, new, Haskin, 1932.

At Auburndale, Florida, *demoditas* flies during the fall and winter while *jucunda* flourishes during the summer. There is a marked difference on the upper side of these, particularly as to the females. The *demoditas* is clear lemon yellow, and the female has no bar across the primary. The *jucunda* is a paler yellow, some of the females even showing a touch of albinism. Both sexes have the bar across primary the female however not being as strongly marked as the male. Also, both sexes have the secondary bordered with black.

Suspecting that these might be conspecific, I obtained eggs from a typical female of *demoditas,* which was caught ovipositing upon Joint Vetch, *Aeschymomene viscidula,* September 29th. The eggs hatched in from three to four days, and within twenty-four days after hatching the pupae were formed. One female emerged seven days later; two males took nine and ten days respectively the last emerging November 6th.

On September 24th I caught a typical female of *jucunda* which was depositing eggs on *Stylosanthus biflora.* The eggs hatched in three days. The larvae were fed on *Stylosanthus* for eight days but on account of its scarcity were subsequently fed on Joint Vetch. In twenty-three days from date of hatching the pupae were formed. Nine days later, October 29th, a male and a female emerged.

The progeny of the *demoditas* mother and the *jucunda* mother were practically identical. None resembled *jucunda.* On the upper side they resembled *demoditas,* but the under side of the hind wings had only a trace of the red powdering typical of *demoditas* the coloration in general being yellowish with a few brown and red scales. This form, for which the name *cepio* G. & S. is available, I have found during the fall months from September to November. It varies more or less as to the amount of brown and rufous powdering. The palest specimens approach the darkest of an intermediate spring form which I will now describe. One feature that remains constant in all the forms is the hairy coal black bar on the primary of the male, separated from the inner margin by a narrow yellow space distinctly tinged with orange.

EUREMA DEMODITAS, form **delioides,** new form.

Upper side identical in coloration and markings with typical *demoditas.* Under side with the hind wing white, or white flecked with gray, as in *jucunda.*

Type locality: Auburndale, FLORIDA. Number and sexes of types: *Holotype,* ♂ March 26, 1932. *Allotype,* ♀ March 28, 1932. *Paratypes,* 10, ♂ ♂, April, 1932. Types in U. S. National Museum; paratypes in U. S. National Museum and in my possession.

Note:—A total of 30 males and a single female were captured during the period of March into May, some individuals with the under side of the hind wing pale yellowish or tinted with buff, thus paralleling the fall *cepio.*

Although the four forms which I have outlined overlap as to seasons I believe it wise to differentiate them in order to emphasize an unusual and well marked change for each of the four seasons.

An entire set of the specimens discussed in this paper has been presented to the U. S. National Museum.

I have to thank Mr. Foster H. Benjamin who very kindly worked out the synonomy of this group for me and helped to condense my notes for publication.

Records of Tachinidae from Illinois with Description of One New Species (Diptera).

By J. A. Rowe, University of Utah.

The following paper is a list of *Tachinidae* represented in the Illinois State Natural History Survey Collection. It was prepared to give the distributional records of the members of this family and any other information regarding the species taken at the time of collection. Forty-three genera and seventy species are listed and one member of the genus *Belvosia* described as new.

All localities cited are in the state of Illinois, except where some other state or province is specified.

I wish to thank Mr. H. H. Ross of the Illinois State Natural History Survey for the privilege of working on this material.

Cistogaster immaculata Macq. Urbana, Sept. 20, 1923, sweeping; Vandalia, June 13, 1909, clover.

Gymnosoma fuliginosa Desv. Ware, Sept. 20, 1931 (Mohr); Urbana, April 4, 1931 (H. H. Ross).

Phorantha calyptrata Coq. Urbana, Sept. 26, 1931 (H. H. Ross); Meredosia, May 29, 1917.

P. occidentis Walk. Dubois, Aug. 9, 1917.

Trichopoda formosa Wied. Oakwood, June 2, 1927 (F. H. Frison); Jordan, Ont., Sept. 10, 1915 (H. Curran).

Cryptomeigenia theutis Walk. Gimlii July 15, 1909.

Paradmontia brevis ? Coq. Urbana, June 20, 1915.

Plectops melissopodis Coq. Dubois, May 23, 1917.

Clatoria spinosa ? Coq. Dubois, July 5, 1909.

Hypostena aenea Coq. Urbana, Sept. 26, 1931 (H. H. Ross).

H. barbata Coq. Dubois, May 10, 1917.

Didyma exigua V. D. W. Urbana, June 10, 1920, parasite of Pipausta ainslei, in corn and smart-weed (C. S. Spooner).

Polidea areos Walk. Urbana, Apr. 27, 1931 (A. R. Park).

Racodineura americana Coq. Dubois, Aug. 8, 1917.

Leucostoma senilis Tns. Bondville, Oct. 1, 1909.

L. sp ? Dubois, Aug. 9, 1917.

Eutrixa masuria Walk. Savanna, July 9, 1917.

Siphona geniculata DeGr. Urbana, Apr. 22, 1917, in cottonwood. White Heath, Apr. 22, 1917.

Plagia americana V. D. W. Urbana, June 27, 1931 (A. R. Park); Bushnell, clover, June 18, 1909.

Biomyia aurigera Coq. Cypress Sept. 2, 1931 (Mohr).

B. GEORGIAE B-B. Dubois, Aug. 10, 1917; White Heath, May 22, 1915; Carbondale, May 27, 1910; Elgin, rye grass and clover, June 25, 1909.

ATACTA APICALIS Coq. Paris, on Protoparce, 1904 (A. A. Garault); Havana, roadside, Sept. 8, 1910.

Belvosia pollinosa n. sp.

Male. Length 15 mm. Front at the vertex slightly longer than the combined length of the second and third antennal joints. Frontals arranged in three indistinct rows. Antennae black. Cheeks thinly pollinose the brown background color showing through in spots. Facial depression and parafrontals white pollinose throughout. Palpi brown, lighter at the tips.

Belvosia pollinosa.

Thorax shining black except in front where it is thinly white pollinose. Sternopleurals eight. Dorso-centrals five. Scutellum black, thinly golden pollinose on the posterior ventral margin, bearing thirteen marginals and numerous submarginals.

First and second abdominal segments shining black. Third and fourth golden pollinose throughout except on the apical

fourth. First abdominal segment with five marginals, second with seven, third and fourth with marginal rows.

Legs black. Coxae with tufts of very large spiny bristles projecting backward. Pulvilli as long as the last tarsal joint. Wings and both calypters brown.

Forceps of the genitalia black, hairy except on the extreme tip, shaped as in figure.

Described from a single male collected at Alto Pass, ILLINOIS, June 5-6, 1919.

Holotype in the collection of the university of Utah.

This species comes out in the key with *B. splendens* Curran, but differs in having the para-frontals pollinose throughout.

LINNAEMYIA COMTA Fall. Urbana, new clover, May 21, 1909.

GYMNOCHAETA ALCEDO Loew. Urbana, June 1, 1929 (Mohr); Vancouver, B. C., Mar. 13, 1912 (H. H. Ross).

EXORISTA DORSALIS Coq. Oregon, June 19, 1917.

E. EUDRYADIS Tns. Chicago, May 30, 1909 (Davis).

E. ORDINARIA V. D. W. Alto Pass, May 7, 1917.

EUPHOROCERA CLARIPENNIS Macq. Vandalia, Sept. 16, 1931 (Mohr).

PHOROCERA LEUCANIAE Coq. Urbana, in woods, April 22, 1926 (T. H. Frison); Carbondale, reared from cocoon, April 16, 1928 (T. H. F.); Muncie, May 3, 1920; Horner, Apr. 26, 1909.

P. RUFILABRUM V. D. W. Oregon, June 19, 1917; Lilly, at Mackinaw River, June 11, 1914; Peoria, on maple, July 23, 1898 (McElfresh); Angerville, June 6, 1915.

P. SAUNDERSII Will. Dubois, May 22, 1917.

FRONTINA ALETIAE Riley. Champaign, Aug. 14, 1915 (Frison).

F. ARCHIPPIVORA Will. Champaign, July 24, 1885.

F. FRENCHII Will. Urbana, June 9, 1903 (Titus); Centralia, June 16, 1909 (Girault); Metropolis, Sept. 19, 1931 (Mohr).

STURMIA DISTINCTA Wied. Kernak, Sept. 2, 1924 (T. H. F.); Metropolis, Sept. 3, 1924 (T. H. F.); Brownsville, Texas, Nov. 26, 1910 (T. Garden): Hayworth, July 24, 1878.

S. FRAUDULENTA V. D. W. Algonquin, June 23, 1896; Aurora, Aug. 15, 1908 (Girault).

S. INQUINATA V. D. W. Oregon, June 19, 1917; Algonquin, June 20, 1896; Fox Lake, Aug. 2, 1924 (T. H. F.); Tonti, May 24, 1912 (Titus); Urbana, July 25, 1848.

S. NIGRITA Tns. Lafayette, Ind., July 19, 1915; River Forest, July 11, 1913; Algonquin (Nason).

S. OCCIDENTALIS Coq. Odin, May 28, 1910, in pit cage; and on flowers of wild parsnip; Plainview, May 3, 1915.

S. PHYCIODIS Coq. Muncie, June 8, 1927 (T. Faud A. G.).
S. STRIGATA V. D. W. Odin, May 31, 1910, parsnip.
ACEMYIA TIBIALIS Coq. White Heath, May 18, 1839, in woods (Morten).
PSEUDOCHAETA ARGENTIFRONS Coq. Carbondale, July 31, 1909 (Hart-Wood); Pulaski, Aug. 3, 1908 (Gerault).
P. PYRALIDIS Coq. Cambridge, June 20, 1931, parasitic on thistle butterfly.
TACHINOMYIA ROBUSTA Tns. Algonquin (Nason), Odin, 1910, on parsnip; St. Paul, Minn., May 30, 1924; Algonquin, June 4, 1914.
BLEPHARIPEZA ADUSTA Loew. Algonquin (Nason); Forreston, June 11, 1892 (Marten).
B. INERMIS Bigot. Algonquin, Ill., June 10, 1915; Clay City, Aug. 22, 1905.
WINTHEMIA MILITARIS Walsh. Pleasent Plains, June 26, 1931 (Mohr).
W. QUADRIPUSTULATA Fab. Algonquin, June 23, 1896; Urbana, July 13, 1931 (Mohr); Agassiz, B. C., taken from the caterpillar of the "white wooly bear" on hops, Aug. 19, 1927 (H. H. Ross); Champaign, July 8, 1909 (Sanborn); Savanna, July 10, 1917; White Heath, May 15, 1915; River Forest, July 11, 1913; Dubois, May 28, 1917; Plainview, May 3, 1915; Alto Pass, June 5, 1919; Centralia, June 9, 1909 (Girault); Vandalia, June 4, 1914, clover; Elgin, June 25, 1909, rye, grass, clover; Virginia, June 17, 1909, red clover; Aurora, June 26, 1909, red clover partly in bloom; Sparta, June 11, 1909, ragged clover field; Prinston, June 21, 1909, weedy clover; Bushnell, June 18, 1909, clover; Oakwood, July 2, 1931 (H. H. Ross); Bluffs, Aug. 19, 1917; Normal, July 7, 1884, boxelder.
PARADIDYMA SINGULARIS Tns. Urbana, June 7, 1916; Odin, May 11, 1910; Normal, Aug. 18, 1887.
HILARELLA POLITA Tns. Havana, Geason's sand-dunes, April 30, 1914; Meredosia, sand pit, Aug. 22, 1917; Urbana, May 18, 1889, pond grove.
BRACHYCOMA SARCOPHAGINA Tns. Urbana, July 3, 1908, clover.
GONIA BREVIPULVILLI Tot. Normal; Ames, Ia., Apr. 22, 1896, Exp. Sta. Vancouver, B. C., March 19, 1926 (H. H. Ross); Urbana, Apr. 1, 1880 (Marten); Teulon, July 20, 1915.
G. FRONTOSA Say. Urbana, dredgeditch, Apr. 25, 1915; Danville, Apr. 5, 1929 (Frison & R. H.); Algonquin, March 20,

1905 (Nason); Seymour, Apr. 20, 1912; Vancouver, B. C. (H. H. Ross); Oakwood, middle fork, Apr. 26, 1911; Dongola, Mar. 9, 1916; Forest Glen; Chicago, Aug., 1878; Mahomet, Apr. 3, 1929 (Frison).

G. LONGIPULVILLI Tot. Olympia, Wash. (T. Kincaid).

G. SAGAX Tns. Homar, Apr. 26, 1909; Urbana, Apr. 23, 1928 (Frison); Algonquin, May 3, 1896.

SPALLANZANIA HESPERIDARUM Will. Sparta, June 10, 1909, weedy clover; Champaign, July 7, 1885, swept from weeds; Urbana, Sept. 25, 1923.

CHAETOGAEDIA ANALIS V. D. W. Urbana, Oct. 6, 1901; Crystal Lake (Titus).

CUPHOCERA FUCATA ? V. D. W. Odin, in pit cage, May 28, 1910; Urbana, Sept., 1931 (Mohr); Makanda, on goldenrod, Oct. 16, 1902 (Titus).

ARCHYTAS ANALIS Fab. Urbana, July 17, 1908, clover; Oakwood, June 2, 1927 (T. H. Fuson); Havana, Devil's Hole, June 23, 1928 (Frison and Hayes).

A. ATERRIMA Desv. Alto Pass, Aug. 11, 1891 (Hart and Shiga); Savanna, July 21, 1892, sweet clover (McElfresh); Odin, Aug. 23, 1909; Milo, Bureau Co., July 15, 1879; Phila., Pa.; Metropolis, on *Xanthium spinosum*, Aug. 15, 1891 (Hart-Shiga); Dubois, June 22, 1905; Aldridge, Aug. 11, 1891 (Hart-Shiga); Urbana, July 3, 1908, clover; Sparta, patchy clover, June 9, 1909.

A. PILOSA Drury. Robertson (Willisten); Normal, July 26, 1883, in and about corn roots.

The material also contained the following genera and species not listed in the Aldrich catalogue of 1905.

ARRHINOMYIA sp ? Dongola, May 11, 1917; Sioux City, Ia., Aug. 29, 1916, swept from bluegrass (A. W. Lindsey).

CYLINDROMYIA ARGENTIA Tns. Freeport, July 4, 1917; Evanston, Apr. 7, 1931 (A. R. Park); Urbana, June 16, 1931 (H. H. Ross).

C. EUCHENOR Walk. Urbana, Aug. 17, 1908, clover; Sparta, June 11, 1909, ragged clover field; Agassiz, B. C., July 22 1926 (R. Glendenning).

LIXOPHAGA sp ? Dubois, Aug. 9, 1917.

PHYLLOMYA sp ? Urbana, Oct. 18, 1914; Muncie, June 10, 1919; Sparta, June 9, 1909, patchy clover field; Ashley, Aug. 7, 1917.

ZENILLIA sp ? Urbana, May 18, 1909; Freeport, July 2, 1917.

G. W. Belfrage's Texas Localities.

By S. W. Geiser, Southern Methodist University, Dallas.

In an obituary notice published in the year 1883,[1] Professor A. S. Packard has the following to say of one of the most elusive students and collectors of the insects that ever worked in the Southwest:

"If the insect fauna of Texas is, at the present time, better known than that of most of the Western States of this continent, it is largely due to the skill and industry of Mr. [G. W.] Belfrage and the late Mr. Jacob Boll, who were the foremost among the few really careful and conscientious collectors in the country. The number of new and interesting species discovered by Mr. Belfrage is really astonishing, considering that they were collected in a very limited area of the State, and several of his discoveries were named after him by our most prominent entomologists. The care and neatness he exhibited in preserving and preparing his specimens, as well as the honesty with which he filled the orders of his numerous correspondents, deservedly procured him a reputation as a collector which extended far beyond the limits of this country."

With this as the sum-total of our knowledge of Gustaf Wilhelm Belfrage, as it had gotten into the history of American entomology, the present writer some few years ago made long-continued investigations of the life of this naturalist, and published in 1929[2] an account of the antecedents and the career of Belfrage. The investigation extended from a county-wide interviewing of Belfrage's contemporaries still living in Bosque County, Texas; and correspondence with most of the world-entomologists, still living, who might have corresponded, as young students of the insects, with Belfrage in the closing days of his career. In Sweden, Belfrage's native country, the help of many members of Belfrage's family was enlisted, and the cordial co-operation secured of Professor Dr. Yngve Sjöstedt, of the Natural History Museum in Stockholm.[3] As a result

[1] [Packard], in *American Naturalist*, 17: 424. 1883.

[2] Geiser, in *Southwest Review*, 14: 381-98, 1929.

[3] I am especially indebted to Docent Dr. Sixten Belfrage (Lund), Prof. Dr. Sjöstedt, and Captain Lennart Belfrage, chairman of the Belfragian Society, Stockholm; as well as to Jenny Belfrage's *Bidrag till Släkten Belfrages Historia*, Göteborg, 1916.

of these researches it was found that Belfrage was descended from a long line of Swedish nobles (three of his four grandparents were barons or baronesses in their own right) and that he had enjoyed excellent training in entomology in his youth. It was found that he was on terms of intimate friendship with the Swedish entomologists, Professors Boheman and Zetterstedt, (the former the first curator of entomology in the Natural History Museum in Stockholm), and with Carl Stål, with whom for many years he conducted a long correspondence on familiar and equal terms. Belfrage's father, it was found, was a Court Chamberlain in the royal palace at Stockholm, and his mother was the Baroness Leijonhufvud, of one of the noblest families of the Swedish noblesse. After a checkered experience in Sweden, young Belfrage was encouraged to come to America; and after an eventful career as an entomological collector in New York, Illinois, and Texas, died in Bosque County, Texas, on December 7, 1882.

In my biographical sketch above referred to, but scanty information could be given relative to Belfrage's career as an entomological collector. In the last three years, however, thanks to the kindness of Professor Sjöstedt (who caused the archives of the Natural History Museum and the Swedish Academy of Sciences to be searched, with most satisfying results); and the directors of several museums and academies of science in America, an extensive Belfrage correspondence has been unearthed, by which it is possible to trace the movements in Illinois and Texas of G. W. Belfrage. The following notes are presented in extension and correction of the former biography.

Belfrage journeyed to America sometime in 1860 or '61. At the time of his coming he was about twenty-six years old. The real reasons for his leaving the homeland are not clear. One thing is certain, however, that "in some way he made it impossible for himself to remain in Sweden and [he] therefore emigrated.[4] Belfrage, in a letter of date 18 March, 1859, to the great Swedish entomologist, Prof. C. J. Boheman, speaks of his prospective departure as final: "I am going to leave my

[4] *S. Belfrage to S. W. Geiser,* 12 Apr., 1929.

country forever, and depart for the land of the Yankees." His letters to Professor Boheman and Dr. Carl Stål, members of the Swedish Academy of Sciences and the *Naturhistoriska Riksmuseum*, reveal that for some time he had contemplated leaving Sweden, and that he looked to his family for an annual subvention. . . .

From a very careful study of the extant Belfrage letters, the following, at least, may be said of his early life. Belfrage had long before 1857 come into terms of almost filial intimacy with Professor Boheman. It is possible that the contact was through Belfrage's father, who may have been a companion-in-arms with Boheman.[5] Passages in the very intimate letters from G. W. Belfrage to Carl Stål raise the question in one's mind as to whether the two had not at some time studied together at Uppsala. Unfortunately, we do not have any of the letters that Belfrage received from Swedish correspondents; for at his death, these were burned, together with a "bale of manuscript," listed by the appraisers of his estate as "of no value," although it appears, from his letters to Stål, to have been a work on the insects of Bosque County, Texas.

In October, 1859, Belfrage finally made up his mind to leave Sweden for America. The approximate date of his departure may be set as late in 1859 or early in 1860. During his last few months in Sweden he rusticated at Köping, a small town at the head of Lake Mälar, west of Stockholm.

Belfrage's first letter from America (one written in response to one several months old, from Boheman) is dated 8 August, 1861. From this letter it appears that Belfrage has been in America for some time; that he has already sent a collection of insects to Boheman; that he is "suffering from that common disease, called a lack of money." The war-excitement is on in America, and his pecuniary embarrassment offers Belfrage the hard alternatives of selling his insect collections at great sacrifice, enlisting in the Federal army, or starving. These months are obscure ones sprinkled but sparsely with missives

[5] Professor Carl Johan Boheman (1796-1868) was a retired army captain; in 1841 he was appointed curator of Entomology at the Natural History Museum in Stockholm. Gustaf Belfrage's father, Axel Ake Belfrage (1796-1885) advanced to a captaincy in the Swedish army in 1820, and quitted the army in 1844, with the brevet-rank of major.

that give fleeting glimpses of want and mental and physical distress. During the last half of 1861 his want was so great that for two days and nights he was without food and shelter, and was obliged to sell valuable insect-collections at a ruinously low figure.[6] After a year's silence Belfrage emerges again in the correspondence, this time in Chicago. Here he remains until the end of 1866, with occasional collecting trips along Lake Michigan and Lake Superior, and to the Swedish colony at Altona, Knox County, Illinois. His life during 1864 and 1865 is reflected in single letters for each of those years. One common theme runs through these letters: the need for insect needles in quantity for use in mounting his collections, and money, money.

During 1866, Belfrage entered into correspondence with all of the leading American entomologists: Cresson, Ulke, Packard, Uhler, Henshaw, Hagen, Scudder and the rest. They encouraged him to carry out a long-cherished plan of his to go to Texas on an insect-collecting trip; and armed with letters from the American Consul at Stockholm, and the Swedish Academy of Science, stating that he was a Swedish subject collecting for the Academy, he set out. "If I go South without such letters," said Belfrage in a message to Boheman asking that they be sent, "you will understand what kind of brotherly love I can expect from the Southerners after having lived among the 'damned Yankees'." He arrived in Houston from New Orleans, on the fourth day of January, 1867. On his arrival, he was penniless, or nearly so; but soon sales of insects (particularly to American and British students, who paid much better than Continental workers) lifted him from poverty. . . .

Belfrage was a prodigious collector. As early as 1869 he advertised an exchange-collection of 25,000 Texan insects, and had won the cordial approval of naturalists as "an active and zealous collector; his mounting of specimens is the very perfection of neatness."[7] He sold continually and extensively during the thirteen subsequent years, both to amateurs and serious students. During many of his collecting-years he collected and sold from ten to fifteen thousand insects; and the total of his collections must have been very great. At the time of his death his collection comprised "36,881 pinned specimens in

good order, in addition to beetles in paper, sawdust, and alcohol, and butterflies in papers"—in itself a great collection, but at that, only a fraction of his life's collections. After Belfrage's death this collection, now the "Belfrage Collection" in the United States National Museum, was purchased by C. V. Riley. In this collection are most of the types of the new species of Hymenoptera described by Cresson in his "Hymenoptera Texana" (1872).

Belfrage long had in mind plans for an extensive trip to collect insects in West Texas and New Mexico; in fact, his hopes and plans recur periodically, like a fixed idea, in his correspondence. In 1867,[8] he voices the hope that he may get a mule and wagon and travel into West Texas, and "collect 100,000 insects per annum." In March, 1868, he was still avowing the same purpose. Belfrage, it appears, collected in several parts of Texas, and not merely in Bosque and McLennan Counties, as Cresson and others have thought. He lived at Houston during all of 1867 and the first half of 1868, when he moved to Bosque County, Texas. He made a fruitless exploring and collecting trip to Quintana, at the mouth of the Brazos River, in April, 1867; in the late fall of 1868, he collected insects in the pine woods of Eastern Texas. A fire in his lodgings at Houston, in February, 1868, destroyed all his books, and many of his early collections. After Belfrage came to Bosque County, he made (April, 1869) a month-long trip to the Border (probably at Laredo, southwest of San Antonio); and in the following year, he made a two-months' trip to West Texas. After each of these trips, he was for a long time afflicted with malarial fever. The great trip that was planned to New Mexico never materialized, as far as I can discover. In 1869 Belfrage issued a prospectus of this in the *Canadian Entomologist*,[9] but advertisements issued as late as 1877 indicate that his wishes were still unfulfilled.

From 1870 to about 1879 Belfrage made his home in Bosque County near the hamlet of Norse; and it was here that he made his magnificent collections of insects from Bosque County.

[8] *G. W. B. to C. J. Boheman*, 28 February, 1862.
[9] *Canadian Naturalist*, 2: 160, 1869.
[8] *G. W. B. to C. J. Boheman*, 31 January, 1867.
[9] *Op. cit.* 2: 159-60; 179-80, 1869.

In 1879 he built for himself a small hut on Meridian Creek, on the "Chris Pederson farm," about three miles from his former home on the "Carl Questad place." Here he was found dead on the morning of December 7, 1882.

Viewing Belfrage through the letters preserved in the archives of the Academy of Sciences at Stockholm, one sees a brilliant, well-read, social and all-too-convivial, companionable man, deeply interested in the work to which he gave his life; deeply loved by those to whom he gave his confidences. He was admired at a distance by the simple country people, his neighbors, who were without the circle of his close acquaintance. He died at the early age of forty-eight, a broken man, but one who has placed students of the entomology of Texas and the Southwest under an obligation that can hardly be overstated.

Bothynotus Fieber: Descriptions of Two New Species from North America (Hemip., Miridae).

By HARRY H. KNIGHT, Iowa State College, Ames.

The genus *Bothynotus* Fieber was erected in 1864 to include the single European species described as *Phytocoris pilosus* Boheman (1852). The genus was not recognized from North America until Wirtner (1917) described *Neobothynotus modestus* from Pennsylvania. At that time the writer (1917) pointed out that he was "unable to find generic points of difference between *Neobothynotus* Wirtner and *Bothynotus* Fieber." We also suggested that *modestus* Wirtner might be an importation of *pilosus* Bohe, but in this we were mistaken as later examination of European specimens of *pilosus* proved the species to be distinct, although members of the same genus. Since that time we have examined specimens of *Bothynotus modestus* Wirtner from Maryland, near Plummer Island (J. D. Hood) and from Wilmington, Ohio (S. A. Watson). The history of this species indicates that it may be widely distributed but specmens are very scarce. Until the present time only two species of *Bothynotus* have been described, hence it is of considerable interest to add two new ones from the Nearctic fauna, indicating that North America may have been the center of origin for species of this genus.

In our list of "Family Miridae of the District of Columbia and vicinity" the writer placed *Bothynotus modestus* Wirtner in subfamily Clivineminae without word of explanation, thus I will review the reasons at this time. Reuter (1910) in his great work "Neue Beiträge zur Phylogenie und Systematik der Miriden" erected the subfamily "Bothynotina" to include *Bothynotus* Fieb. and a new genus *Dashymenia* Popp. In the same publication Reuter employed the subfamily name "Ambraciina" and included therein his "Division Clivinemaria" of 1876. Van Duzee (1916) in his "Check List of Hemiptera" employed the principle of priority to subfamily names and raised Reuter's group name, Clivinemaria of 1876, to the status of subfamily and included the American genera, *Clivinema* Reut. and *Largidea* Van D.

The writer finds that *Bothynotus* Fieber is closely allied to *Clivinema* Reuter as shown by structure of the genitalia, form of toothed claws and bristle-like arolia, also in the peculiar modifications of the prothorax, especially involving the collar and calli. Examination of the genital claspers of the various species of *Clivinema, Largidea* and *Bothynotus,* show a surprising amount of similarity, in fact the form of left clasper appears to be characteristic of these genera and therefore of the subfamily Clivineminae. Apparently no generic distinctions can be based upon the claspers, but slight modifications may in some cases be useful for specific determinations. From these observations it is evident that Bothynotina Reuter (1910) must be merged with the older subfamily group Clivineminae Reuter (1876).

Bothynotus barberi n. sp.

Differs from *modestus* Wirtner in the smaller size, also in the shorter second antennal segment which in length is just equal to width of head across eyes; anterior angles of pronotum somewhat inflated, arising distinctly above the smooth impressed calli.

♂. Length 3.5 mm., width 1.7 mm. Head: width .75 mm., vertex .47 mm.; frons more distinctly convex and tylus less prominent than in *modestus;* color uniformly pale red, tylus

Proc. U. S. Nat. Museum, vol. 75, art. 13, p. 8, 1929.

more brownish, clothed with prominent pale pubescence. Rostrum fuscous (broken). Antennae: segment I, length .346 mm.; II, .78 mm., cylindrical, about equal to segment I in thickness; III, .346 mm., slender; IV, .30 mm., slender; fuscous to blackish, segment I paler at base; clothed with prominent pale yellowish pubescence, interspersed with a few longer hairs, especially on the last three segments.

Pronotum: length .78 mm., width at base 1.34 mm.; disk coarsely, uniformly punctate, pleura more finely punctate; calli deeply impressed, shining, impunctate except for a single deep puncture at each inner angle; collar nearly flat, separated from calli by impressed line; lateral margin of disk slightly concave, anterior angles rather distinctly inflated, rising well above the level of the calli and collar, projecting laterally above the coxal cleft, the latter very deep at dorsal extremity; color uniformly brownish black, collar and calli reddish to brownish. Disk as well as the whole dorsum clothed with prominent, erect pale hairs, the tip of each hair decurved; membrane more finely but distinctly pubescent. Scutellum moderately convex, pubescent but impunctate.

Hemelytra: embolar margins slightly sinuate, not arcuate; embolium flat, prominent, lateral edge sharp, slightly reflexed; finely punctate, color brownish black, slightly translucent; cuneus slightly concave but lateral margins not distinctly reflexed; membrane uniformly dusky, veins darker, finely wrinkled, finely but distinctly pubescent. Body beneath reddish brown to blackish; ostiolar peritreme pale fuscous, surface alutaceous, central lobe projecting strongly laterally.

Legs uniformly pale fuscous brown, tips of hind femora reddish; strongly pubescent, hind femora with two or three long hairs on posterior margin, tibiae not distinctly spinulose; claws toothed at base, arolia bristle-like, and in this respect very similar to species of *Clivinema* Reuter. Genital claspers apparently generic in character, their form very similar to that observed in *Clivinema* Reut. and *Largidea* Van D.

Holotype: ♂ July 20, 1905, Huachuca Mts., ARIZONA (H. G. Barber); author's collection. Named in honor of the collector, Mr. H. G. Barber, to whom the writer is indebted for several new or interesting Miridae.

Bothynotus johnstoni n. sp.

Distinguished from *barberi* by the smaller size and reflexed outer margin of the cuneus; anterior angles of pronotum not inflated, pubescence erect, not decurved.

♂. Length 2.7 mm., width 1.17 mm. Head: width .57 mm., vertex .32 mm.; color red, shining, tylus and buccula fuscous, a pair of small spots on vertex and a mark each side on frons, fuscous. Rostrum, length .78 mm., reaching upon base of intermediate coxae, fuscous. Antennae: segment I, length .25 mm., reddish brown to black; II, .60 mm., cylindrical, equal in thickness to segment I but more slender at base, dark brownish black, clothed with prominent pale pubescence, length of longest hairs about equal to thickness of segment; III, broken.

Pronotum: length .62 mm.; width at base .99 mm.; disk moderately convex, more finely punctate than *barberi* and the anterior angles are not inflated; collar convex, distinctly constricted and separated from calli, the latter smooth, impressed on posterior margins, but very little below level of disk. Scutellum moderately convex, apex slightly more prominent, impunctate, finely rugulose on disk.

General coloration uniformly brownish black, shining, hemelytra semi-translucent; head red, ventral surface reddish brown to blackish, legs pale fusco-brownish, femora becoming reddish on apical half. Clothed with prominent, erect pale yellowish to dusky pubescence, hairs of dorsum not decurved at tips.

Hemelytra: embolar margins nearly straight, curved in at base; embolium with outer edge sharp, narrowly reflexed; clavus with inner half more coarsely and strongly punctate than elsewhere; cuneus with outer margin reflexed to form a right angle with disk, impunctate but strongly pubescent. Membrane uniformly dark fuscous, finely wrinkled, finely but distinctly pubescent. Genital claspers of the same general form as in *barberi* but the left clasper with distal one-third thicker.

Holotype: ♂ June 3, 1926, Carthage, MISSISSIPPI (H. G. Johnston); author's collection. Named in honor of the collector, Mr. Horace G. Johnston, who is doing some good work with Miridae.

Swarming of Scatopse atrata Say (Diptera: Scatopsidae)

On May 3, 1932, I sent the following notes to Dr. J. M. Aldrich, of the United States National Museum. At this place, Lyerly, Georgia, Chattooga Co., about 55 miles south of Chattanooga, Tennessee, on April 22, 1932, the insects herewith were taken where they were swarming as they had been swarming for several days prior thereto. Their issuance was from a vertical "joint" between corner boards of a dwelling house wall at northwest corner of building. The joint was finished by means of a quarter round moulding and numerous nail *holes* together with a poor fit had enabled them to seek out a home within.

These insects were swarming and were conducting propagative congress at once. Many dozens in pairs were observed hurriedly running over the wall boards, meanwhile having union and each being of apparently the same size, I could not decide which sex was being towed backward. There were no reversals of direction in the towing. There was no tandem processioning commonly observed in termite swarms. There was some interference from third parties as the towing was being done.

These insects are *strong* and capable *fliers;* they had a dabbing motion in flight when coming back to vicinity of their issuance point as if seeking to alight, or as if seeking to choose something. Many hundreds issued and few departed at once. Most of them tarried and moved incessantly about in copulation or interfering with copulating pairs. There was not observed any pairing outside; all seemed to issue singly or one towing another per genitalia. More than half of them took to the air and remained near place of issuance. I think none cast any wings. They kept up their swarming for a week but now are not visible.

The house-corner is beneath a good porch roof, *i. e.*, good for 6 years past. The house is on brick piers 2 feet high. The wood is all dry. Much elm tree shade is near by. I do not know what they are and ask you to have them named and described as to significance, etc.

Dr. Aldrich replied: "The fly is *Scatopse atrata* Say; it is a very common insect, found on the inside of windows. especially in basements. I see by my index it has been reared from decaying lemons, onions, plums, butternut hulls, and also from animal excrement. It appears to be a general scavenger in decomposing vegetable matter.

"I have never heard of the issuance of the insect in the way you describe, but the flies are so small that they no doubt have been overlooked hundreds of times."

JOHN G. FOSTER, Lyerly, Georgia.

Entomological Literature

COMPILED BY LAURA S. MACKEY UNDER THE SUPERVISION OF E. T. CRESSON, JR.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of ENTOMOLOGICAL NEWS for 10c. The number of, or annual volume, and in some cases the part, heft, &c. the latter within ( ) follows; then the pagination follows the colon :

All continued papers, with few exceptions, are recorded only at their first installments.

*Papers containing new forms or names have an * preceding the author's name.

(S) Papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

☞*Note the change in the method of citing the bibliographical references, as explained above.*

Papers published in the Entomological News are not listed.

GENERAL.—Burr, M.—Orthoptera and spiders. [21] 45: 38-40. **Finkenbrink, W.**—Experimentelle untersuchungen zur dewitzschen hypothese des apterismus bei insekten. [46] 26: 385-426, ill. **Gaines, J. C.**—Trap collections of insects in cotton in 1932. [19] 28: 47-53, ill. **Holland, W. J.**—Obituary. By G. P. Engelhardt. [19] 28: 79. **Ianisch & Maercks.**—Licht und insektenentwicklung. [46] 26: 372-384, ill. **Schulze, P.**—Ueber zeckengynander. [46] 26: 427-436, ill. **Williamson, E. B.**—Obituary. By F. Payne. [68] 77: 344.

ANATOMY, PHYSIOLOGY, ETC.—Avel, M. M.—Sur le fonctionnement possible par prise automatique de la ventouse des larves de Blépharocérides (Torrenticoles). [Bull. Soc. Zool. France] 57: 140-142. **Balduf, W. V.**—The morphology of the ovipositor of Draeculacephala (Cicadellidae). [7] 26: 64-75, ill. **Bledowski u. Krainska.**—Die entwicklung von Banchus femoralis. (Bibl. Univ. Lib. Polonae, 1925, Fasc. 16, 50 pp., ill.) **Bondroit, J.**—Origine de l'ouvrière des fourmis. [Ann. Soc. R. Zool. Belgique] 62: 13-24. **Brandt, H. A.**—Histology of the silk glands of certain Avicullariidae. [13] 25: 1-6, ill. **Chickering & Bacorn.**—Spermatogenesis in the Belostomatidae. Multiple chromosomes in Lethocerus. [Pap. Michigan Acad. Sci. Arts & Let.] 17: 529-534, ill. **Cvetkov & Ephroimson.**—La cinétique de la photo réaction chez Drosophila melanogaster. [Bull. Acad. Sci. U. R. S. S.] 1932: 1151-1153 [in Russian]. **Fisher, R. A.**—On the evidence against the chemical induc-

tion of melanism in lepidoptera. [Pro. R. Soc., Lond.] (B) 112: 407-416. **Fletcher & Haub.**—Digestion in blowfly larvae, Phormia regina, used in the treatment of osteomyelitis. [43] 33: 101-109, ill. **Hedenius, A.**—Molecular weights of the blood pigments of the invertebrates. [31] 131: 325. **Heymons & Lühmann.**—Die vasa malpighi von Galerucella viburni. [34] 102: 78-86, ill. **Hilton, W. A.**—Nervous system and sense organs. Acarina [13] 25: 8-12, ill. **Hinman, E. H.**—Enzymes in the digestive tract of mosquito larvae. [7] 26: 45-52. **Hüsing, H.**—Wieviel nektar fasst die honigblase der Honigbiene? [17] 50: 80-82, cont. **Leeson & Mellanby.**—Insects and micro-climates. [31] 131: 363. **Munscheid, L.**—Die metamorphose des labiums der Odonaten. [94] 143: 201-240, ill. **Pflugfelder, O.**—Ueber den feineren bau der schläfenorgane der Myriapoden. [94] 143: 127-155, ill. **Rabaud, E.**—L'instinct maternel des Araignées. Le rapt du sac ovigère. [Bull. Soc. Zool. France] 57: 258-262. **Stammer, H. J.**—Die metamorphose der syrphide Temnostoma vespiforme und die eigenartigen anpassungen der larve dieses tieres an das bohren im holz. [46] 26: 437-446, ill. **Thomas, M.**—L'instinct chez les Araignées. [33] 72: 273-280, ill. **Thomas, M.**—L'instinct et la psychologie des Hyménopterès. Le déterminisme des moeurs des guêpes et des abeilles sociales. [33] 72: 177-198. **Vance & Smith.**—The larval head of parasitic hymenoptera and nomenclature of its parts. [7] 26: 86-94, ill. **Wotzel, F.**—Zur kenntnis der tympanalorgane der Hydrocores. [94] 143: 241-262, ill.

ARACHNIDA AND MYRIOPODA.—Chickering, A. M.—Araneae from the Douglas Lake Region, Michigan. Additions to the list of Araneae from Michigan. [Pap. Michigan Acad. Sci. Arts & Let.] 17: 515-520, 521-528. ***Crosby & Bishop.**—American spiders: Erigoneae, males with cephalic pits. [7] 26: 105-182, ill. ***Grandjean, F.**—La famille des Protoplophoridae (Acariens). [Bull. Soc. Zool. France] 57: 10-36, ill. (S). ***Jacot, A. P.**—Phthiracarid mites of Florida. [Jour. E. Mitchell Sc. Soc.] 48: 232-267, ill.

THE SMALLER ORDERS OF INSECTS.—Bird, R. D.—Dragonfly hunting in Oklahoma. [76] 1933: 371-377, ill. **Edinger, O. H.**—Family Sminthuridae of Southern California. [13] 25: 7. **Geijskes, D. C.**—The dragonfly-fauna of Trinidad in the British West Indies. [Zool. Meded. Mus. Nat. Hist. Leiden] 15: 96-128, ill. ***Sámal, J.**—Beiträge zur kenntnis der Plecopteren-fauna Südlabradors. [34] 102: 95-100, ill. **Stanford, J. S.**—A preliminary list of Utah Siphonaptera. [Pro. Utah Acad. Sci.] 8: 153-154. ***Traver, J. R.**—Mayflies of North Carolina. [Jour. E. Mitchell Sc. Soc.]

48: 141-206, ill. ***Watson, J. R.**—Two new species of Plectrothrips. [39] 17: 16-18, ill.

ORTHOPTERA.—Hebard, M.—The orthoptera of Minnesota. [Univ. Minn. Agric. Exp. Sta.] Tech. Bull. 85: 61 pp. ***Hebard, M.**—Studies in the Dermaptera and Orthoptera of Colombia. [1] 59: 13-67, ill. **Rehn, J. A. G.**—Some Dermaptera from Angola, northern Rhodesia and the Belgian Congo, with the description of a new species of Karschiella. [1] 59: 1-10.

HEMIPTERA.—Abbott, C. E.—Notes on the lift history of Jalysus spinosus. [19] 28: 43-44, ill. **Cummings & Austen.**—The bed-bug. Its habits and life history and how to deal with it. [Brit. Mus.] Econ. Ser. No. 5: 27 pp., ill. **Drake & Harris.**—New American Veliidae. [Pro. Biol. Soc. Washington] 46: 45-53. ***Granovsky, A. A.**—Two new genera and species of Aphiidae. [10] 35: 29-43, ill. ***Green, E. E.**—Notes on some Coccidae from Surinam, Dutch Guiana, with descriptions of new species. [Stylops] 2: 49-58, ill. **Lerch, E. C.**—A list of Homoptera from Ontario [19] 28: 76-78. **Wilson, J. W.**—(See under Lepidoptera.)

LEPIDOPTERA.—Comstock & Dammers.—Notes on the life histories of two California lepidopterous insects. [38] 32: 27-37, ill. **Comstock & Henne.**—A new Lycaenid from southern California. [38] 32: 23-26. **Schüssler, H.**—Lepidopterorum Catalogus. Pars 55. Saturniidae: 1. Subfam. Attacinae. 81 pp. **Stichel, H.**—Lepidopterorum Catalogus. Pars. 54. Amathusiidae. 171 pp. ***Williams, R. C.**—A new hesperid from Mexico (Hesperiidae). [1] 59: 11-12, ill. **Wilson, J. W.**—The biology of parasites and predators of Laphygma exigua reared during the season of 1932. [39] 17: 1-15, ill.

DIPTERA.—Bromley, S. W.—Diptera of Patagonia and South Chile. Asilidae. pt. 5: 261-284, ill. **Collin, J. E.**—Meigen's "Nouvelle Classification": A reply to Mr. Goffe. [8] 69: 61-65. ***Curran, C. H.**—The Canadian species of the tachinid genera Cryptomeigenia and Tachinomyia. [Trans. R. Soc. Can.] 20, (V): 155-171, ill. **Edwards, F. W.**—Semi-final words on Meigen's "Nouvelle Classification." [8] 69: 59-61. ***Edwards, F. W.**—Diptera of Patagonia and South Chile. Chironomidae. pt. 2: 233-331; Scenopinidae, Mydaida. pt. 5: 258-260, ill. **James, M. T.**—New Asilidae from Colorado. [40] No. 596: 3 pp. **Malloch, J. R.**—The genus Coelopa (Coelopidae). [75] 11: 339-350, ill. ***Malloch, J. R.**—Diptera of Patagonia and South Chile. Rhagionidae, Therevidae, Lonchopteridae. pt. 5: 199-257, ill. **Metcalf, C. L.**—An obscure Temnostoma differentiated by its larval characters (Syrphidae). [7] 26: 1-8, ill. ***Parent, O.**—Die

ausbeute der deutschen Chaco-Expedition. Dolichopodidae. [56] 11: 241-259, ill. ***Serafim & Davis.**—Distribution of Aëdes (Taeniorhynchus) Taeniorhynchus. Aëdes (Taeniorhynchus) jacobinae, new species. (S). [7] 26: 13-19, ill. **Soot-Ryen, T.**—Diptera from Arctic Siberia. [Medd. Zool. Mus., Oslo] No. 14: 7 pp. ***Van Duzee, M. C.**—New Dolichopidae from North America with notes on several described species. [40] 599: 27 pp., ill. **Wilson, J. W.**—(See under Lepidoptera.)

COLEOPTERA.—*Arrow, G. J.—A few new Melolonthine Coleoptera from Mexico. [75] 11: 145-151. ***Arrow, G. J.**—The genus Uroxys (Copridae) with descriptions of some new species. [75] 11: 385-399, ill. (S.) **Brandt, M.**—Am nest des kranichs. [Der Naturf., Berlin] 9: 455-457, ill. **Dobzhansky, T.**—Geographical variation in lady-beetles. [90] 67: 97-126, ill. **Gahan & Laing.**—Furniture beetles. Their life-history and how to check or prevent the damage caused by the worm. [Brit. Mus.] Econ. Ser. No. 11: 30 pp., ill. ***Marshall, G.**—New neotropical Curculionidae. [Stylops] 2: 59-69, ill. ***Méquignon, A.**—Sur les Chelonarium des Antilles avec descriptions d'espèces nouvelles (Byrrhidae). [25] 38: 46-47. **Moderegger, U.**—Ueber gerichtete variabilität bei Coccinelliden. Zur variabilität von Coccinella 14-pustulata. [46] 26: 327-333, ill. ***Reichensperger, A.**—Neue ecitophile Histeriden aus Mittel-und Sudamerika. [34] 101: 299-309, ill. **van Emden, F.**—Die larven der Callirrhipini. [33] 72: 199-259, ill. **Wolcott & Montgomery.**—An ecological study of the coleopterous fauna of a tamarack swamp. [43] 33: 113-169.

HYMENOPTERA.—*Butcher, F. G.—Hymenopterous parasites of Gyrinidae with descriptions of new species of Hemiteles. [7] 26: 76-85, ill. ***Cockerell, T. D. A.**—Bees collected by Mrs. Maurice T. James in Pingree Park, Colorado. [7] 26: 40-44. **Crèvecoeur, A.**—Recherches biologiques sur Ammophila campestris (Sphegidae). [33] 72: 164-176. ***Cushman, R. A.**—Descriptions of new ichneumon-flies with taxonomic notes. [50] 82, Art. 14: 16 pp. ***Kennedy & Schramm.**—A new Strumigenys with notes on Ohio species (Formicidae). [7] 26: 95-104, ill. **Parker & Smith.**—Eulophus viridulus, a parasite of Pyrausta nubilalis. [7] 26: 21-39, ill. **Ritcher, P. O.**—The external morphology of larval Bremidae and key to certain species. [7] 26: 53-63, ill. **Wilson, J. W.**—(See under Lepidoptera.)

SPECIAL NOTES—Johansen, J. P.—Danmarks rovbiller eller billefam. Staphylinidae's Danske slaegter og arter. Kobenhavn. 1914. 660 pp., ill. This may be of interest to students of the Staphylinidae.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Wanted—The first thirteen volumes of Entomological News, 1890 to 1902 inclusive. Preferably in original monthly parts, unbound. Write John M. Geddes, 331 High St., Williamsport, Pa.

Wanted—Names and addresses of those desiring Coleoptera and Lepidoptera of southwest Arkansas.—Miss Louise Knobel, E. 3rd St., Hope, Arkansas.

Wanted—October, 1919, and December, 1919, copies of Bulletin of the Brooklyn Entomological Society. Cash. Harriet A. Wickwire, 55 Tompkins St., Cortland, N. Y.

Wanted for Cash or Exchange—Uncommon species of North American Lepidoptera. Several of each kind. D. V. Brown, Pleasanton, California.

Butterflies—Desire correspondence from Western United States, Canada and Alaska. Will exchange rare California material for specimens from your locality. Lloyd M. Martin, P. O. Box 52, Roscoe, California.

Exchange—Local Venezuelan (South America) species of lepidoptera offered in exchange for North American species. Oscar Zuloaga, P. O. Box 263, Caracas, Venezuela.

Exchange.—Desire Lepidoptera, particularly specimens and data of Wisconsin and U. S. Catocala. Exchange for same. Wm. E. Sieker, 46 Breeze Terrace, Madison, Wisconsin.

Will buy or exchange—Pinned Microlepidoptera and papered Pieridae of North America. Full data with all specimens. Named material of all groups offered. Alexander B. Klots, University of Rochester, Rochester, N. Y.

Wanted—West Coast Geometrids for cash or in exchange for California Butterflies. Edward Guedet. P. O. Box 305, Napa, Calif.

Wanted—Western species of Bumblebees, all three castes; also Psithyrus and Catocala. A. P. Morse, Peabody Museum, Salem, Mass.

Will Buy Agromyzidae from North, South, Central America and the West Indies. Special prices for reared material with host records and pressed specimens of mines. S. W. Frost, Arendtsville, Pennsylvania.

Wanted—Hypenids and other quadrifid Noctuids from all parts of North America by exchange or purchase. A. Glenn Richards, Jr., Dept. Biology, Univ. of Rochester, Rochester. N. Y.

Wanted—Names and addresses of those desiring insects from Wisconsin. Will collect in all orders from May to October. Correspondence invited. George Kettler, Platteville, Wis.

Wanted—Names and addresses of those desiring Coleoptera, Lepidoptera and Hymenoptera of Pennsylvania and New Jersey. R. C. Casselberry, 71 E. Price Ave., Lansdowne, Pa.

Exchange—Texas Orthoptera. F. B. Isely, Trinity University, Waxahachie, Texas.

Wanted—Names and addresses of those desiring insects from Colorado. Charles H. Hicks, P. O. Box 262, Boulder, Colorado.

Ward's Entomological Services

Entomological Supplies and Equipment

Carefully designed by professional entomologists. Material of high quality at low prices. *Send for Catalogue No. 348.*

Insect Preparations

Life Histories, Type Collections, Collections of Economic Insects and Biological Insect Collections. All specimens are accurately determined. *Send for Catalogue No. 360.*

Insects for the Pest Collection

We have in stock over three hundred species of North American Insect Pests. *Send for Price List No. 349.*

Ward's Entomological Bulletin

A monthly publication sent free to all entomologists requesting it.

Information for the Beginner

Send for "*Directions for Collecting and Preserving Insects*" by Dr. A. B. Klots. A mine of useful information. Price 15 cents.

Ward's Natural Science Establishment, Inc.

P. O. Box 24, Beechwood Station

ROCHESTER, N. Y., U. S. A.

The Frauk A. Ward Foundation
of Natural Science of the
University of Rochester

BUTTERFLY TRANSITION FORMS AND "FREAKS" WANTED

WHEN YOU SELL YOUR COLLECTIONS, SELL THESE KINDS OF SPECIMENS SEPARATELY. THEY BRING MORE.

JEANE D. GUNDER,

310 LINDA VISTA AVENUE, PASADENA, CALIFORNIA

For Sale native Florida Butterflies and Moths spread for Riker Mounts or in papers. Also make up Riker Mounts to order. Chrysalids and Larvae.

MRS. LESLEY E. FORSYTH,

Florida City, Florida.

Fine Indian Butterflies in papers including about 20 different Papilios, showy Delias, Charaxes, etc., $5.00 per 100 (50 species). Several thousand Morphos from French Guiana, etc., at cheap rates. British Lepidoptera, 1500 species; British Coleoptera, 2000 species, cheap named collections. British Diurnals, in papers, 100 specimens (50 species) named=$3.00, mailed free.

Many important books on Lepidoptera and Coleoptera.
Lists from

A. FORD

42. IRVING ROAD, BOURNEMOUTH, ENGLAND

JUST OFF *the* PRESS

Jungle Bees and Wasps

of

BARRO COLORADO ISLAND

By PHIL RAU

338 Pages **120 Photographic Illustrations**
Cloth Bound **Gold Stamped**

An account of the ecology and biology of the social and solitary wasps and stingless bees of a jungle island in Panama, with special attention to their mental attributes and adaptations, and comparison of their habits and instincts with those of their near relatives in the temperate regions. All of the observations and deductions are brought to a focus in a final chapter. "Mind as a forerunner in Evolution," which views the method of organic evolution in a new light.

Price $2.75, Postage 15c Extra

Published by

PHIL RAU, 548 E. Argonne Drive, Kirkwood, Missouri

RECENT LITERATURE

FOR SALE BY

THE AMERICAN ENTOMOLOGICAL SOCIETY

1900 RACE STREET, PHILADELPHIA, PA.

COLEOPTERA

862.—Blaisdell (F. E.).—Studies in the Melyridae Number Four. (Trans., 50, 313-318, 1925) ..... .20

961.—Blaisdell (F. E.).—Studies in the Melyridae Number Ten. (Trans., 57, 325-331, 1 pl., 1932) ..... .20

963.—Blaisdell (F. E.).—Studies in the Tenebrionid tribe Scaurini: a monographic revision of the Eulabes. (Trans., 58, 35-101, 6 pls. 1932) 1.50

DIPTERA.

962.—Cresson (E. T., Jr.).—Studies in the dipterous family Ephydridae. Paper 4. (Trans., 58, 1-34, 1932) ..... .65

965.—Painter (R. H.).—A monographic study of the genus Geron Meigen as it occurs in the United States (Bombyliidae). (Trans., 58, 139-167, 2 pls., 1932) ..... .60

ORTHOPTERA.

964.—Rehn, (J. A. G.).—New or little known Neotropical Blattidae, No. 3. (Trans., 58, 103-137, 2 pls., 1932) .... .75

967.—Hebard (Morgan).—New species and records of Mexican Orthoptera. (Trans., 58, 201-371, 5 pls., 1932) 3.50

LEPIDOPTERA

966.—Bell (E. L.).—Studies in the genus Phocides with descriptions of new species (Hesperiidae). (Trans., 58, 169-199, 5 pls., 1932) ..... .75

GENERAL

3201.—Dietz (W.G.).—Obituary by Marjorie Dietz Bachelor. Bibliography by E. T. Cresson, Jr. (Ent. News, 43, 279-282, 1932) ..... .20